COMPETITIVE CONDITIONS IN THE TURKISH BANKING INDUSTRY

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ÖZET

Bu çalışma, Türk bankacılık sistemindeki rekabet koşullarını 1983-1996 dönemi için yeni bir metodla incelemektedir. Türk bankacılığının rekabet koşulları test etmek amacıyla elde edilen verilere, Rosse-Panzar (1987) tarafından geliştirilen metod uygulanmıştır. Yapılan analizler, 1988 – 1996 dönemi için bankacılık sisteminin ne monopol ne de tam rekabetçi yapıda olmadığını ancak, banka gelirlerinin tekelci rekabet koşullarında (Monopolistic competition) kazanılıyormuş görüntüsü verdiğini göstermiştir. Bununla beraber yapılan analizler 1983 yılında ticari bankaların gelirlerini oligapolistik bir ortamda kazandıklarını göstermektedir. Böylece 1983 ve 1988 –1996 dönemleri arasında bankaların piyasa davranışları değişmiştir.

ABSTRACT

This paper examines empirically the competitive conditions in the Turkish banking industry for the years 1983 to 1996 by applying a new method previously applied to the U.S. and Canadian banking industries. The Rosse-Panzar methodology has been used to test for the evidence of contestability of the Turkish banking. The findings of our study suggest that the banking market in Turkey was neither monopolistic nor perfectly competitive between 1988 and 1996. Banking revenues behave as if they were earned under the monopolistic competition. The results of the paper also indicate that commercial banking in 1983 earned revenues under the monopoly or conjectural variation short-run oligopoly.

INTRODUCTION

The objective of this paper is to investigate the competitive conditions in the Turkish banking industry o w the period between 1983 and 1996 by applying a new method previously *applied* to the U.S. and Canadian banking industries. The Turkish banking system experienced substantial changes as a result of the deregulation in the 1980s. Most restrictions on interest rates, market entry, and exchange rates were eliminated, and the number of national private and foreign banks increased. This numerical increase would suggest that competition in the Turkish banking industry has increased. The Rosse-Panzar methodology has been used to test for the evidence of contestability of the Turkish banking system.

The theory of contestable markets developed by Baumol, Panzar, and Willig (1982) states that oligopolies and monopolies will sometimes behave very much like perfectly competitive firms (Baumol et al.1982 and Baumol, 1982). They argue that firms will be unable to exploit their market power when the market is contestable. By this is meant that there are potential competitors who are able to enter and exit rapidly from the market and that established firms have no cost advantage over these potential competitors. Because the entry is costless, a new firm can enter the market very quickly if an incumbent firm intends to charge a price above the average cost. Therefore, when entry is perfectly free and exit is costless, the market is defined as contestable. In this market, firms will operate as if they were perfectly competitive and sell at a price that only covers their average cost. Thus, in the equilibrium, they will earn zero economic profits and there will be no entry.

There have been few applications of the contestable markets theory to the banking. Studies by Shaffer (1981, 1982, and 1994), Nathan and Neave (1989), and Molyneux et al. (1994 and 1996) are the most important among others. They employed tests developed by Rosse and Panzar (1977) and Panzar and Rosse (1987) to cxamine competitive conditions of the banking industry in the U.S., Canada. Europe. and Japan. Shaffer (1981 and 1982) and Nathan and Neave (1989) found some evidence that the U.S. and Canadian banking markets exhibit characteristics of contestability.

The rest of the paper is organized as follows. The next section discusses structure and deregulation in the Turkish financial system. Section 3 presents the Rosse-Panzar Model. Section 4 discusses recent literature. In section 5, we discuss the econometric specification and the data as well as the empirical results. The final section draws the main conclusion.

OVERVIEW OF BANKING ENVIRONMENT IN TURKEY

In the 1970s, the Turkish banking was a closed system, heavily regulated in terms of market entry. interest rates, and exchange rates, protected from external competition. conservative with respect to innovations. and controlled by the large state-owned banks. Since interest rates were highly regulated, banks were able to obtain their primary input, deposits, at a very low cost. Furthermore, international capital movements and foreign exchange operations were subject to tight controls.

To increase the efficiency and competition of the financial system, the Turkish Government announced the liberalization program in January 1980. One of the primary goals of the financial liberalization program was to increase competition in the hanking sector by eliminating restrictions on market entry, interest rates on loans and deposits. and exchange rates. The first important step to increase competition in the market began with the elimination of ceiling on interest rates and the introduction of certificates of deposits (CDs) in July 1980. New foreign and national private banks started to enter the market, and severe competition occurred among banks immediately after the elimination of restrictions on interest rates and market entry. The number of banks operating in Turkey increased from 43 in 1980 to 69 in 1996 of which 20 were foreign banks. There were also several exits from the industry due to financial crash both in 1982 and 1994. Other developments in the financial system also promoted competition in the banking market: In 1984, Turkish citizens were allowed to hold foreign exchange deposits in banks. In 1985, the Istanbul Stock Exchange was reopened. It became operational in 1986. The Central Hank established an Interbank Money Market in 1986. Foreign exchange operations and intemational capital movements were liberalized entirely and the Turkish lira became convertible in 1989. In 1990. hanks became completely free to determine their exchange rates.

The analyzed period witnessed rapid technological change in the production of financial services (computerizing banking operations, ATMs, recently PC hanking etc.). The banking system also introduced new financial instruments in this period including repos (repurchasing agreements), swaps, forwards. futures, credit cards, and consumer loans among the others.

Table I illustrates the structural changes in the Turkish banking industry and reports the five-firm market concentration ratios with respect to total assets and deposits, number of hanks operating in the market. total assets, total loans, total deposits, and total assets-GNP ratio over the years between 1983 and 1996. Although the five-firm concentration ratio with respect to total assets has slowly declined since 1980. it is still high, about 46 percent. The reason of relatively slow declining trend in the market concentration may be explained by the dominance of the large state-owned hanks in the hanking sector. The share of total assets held by the state-owned banks did not changc dramatically from 1980 to 1996. In 1996, there were five state-owned commercial banks in the industry and their share in the total assets was 38%. By observing this high concentration ratio, one would think that the Turkish banking market has an oligopolistic structure. The numerical increase in the banking sector, on the other hand, would suggest that competitive conditions in the market have increased during the 1980s.

In short. the numerical increase in both national private banks and in foreign banks, interest rate deregulation, and the introduction of new financial products to the market suggest that competitive conditions in the Turkish financial sector increased during the analyzed period. Therefore, it is worthwhile to cxamine whether the Turkish banking system exhibits characteristics of contestability. To test this. the Rosse-Panzar (1977) methodology has been used to examine competitive conditions in the Turkish banking system and to provide new empirical evidence for the contestable market theory. The model is estimated for a cross-

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sectional data set for the year 1983 and the years between 1988 and 1996. The c ce of the period to study is determined by mainly the availability of data and to see whether there was a change in competitive conduct between early 1980s and the late 1980s and the first half of the 1990s.

Table 1. The Five-firm Market Concentration Ratios (CR5) and Number of Banks in the Market Between 1988 and 1996.
Source: Turkish Bankers Association
Note: The number of banks includes both commercial banks and Investment & development banks. Total assets, total loans, and total deposits are m U.S. dollars

Years	CR5 Assets	CR5 Deposits	Number of banks	Total Assets	Total Loans	Total Deposits	TA/GNP
1983	0.611	0.706	46	11,712	5,715	6,022	0.28
1988	0.536	0.606	60	35,844	14,468	20,401	0.51
1989	0.517	0.597	63	45,384	19,233	26,151	0.46
1990	0.511	0.584	66	55,604	26,242	31,369	0.43
1991	0.484	0.543	65	56,996	25,091	32,003	0.47
1992	0.490	0.558	69	63,382	26,564	34,965	0.50
1993	0.482	0.550	70	68,638	29,146	35,206	0.55
1994	0.499	0.565	67	51,630	20,278	32,665	0.52
1995	0.478	0.528	69	68,397	29,072	44,431	0.52
1996	0.464	0.524	69	83,300	35,900	57,000	0.59

THE ROSSE-PANZAR MODEL

A test developed by Rosse and Panzar (1977) examines the relationship between input prices and equilibrium gross revenue derived from the theory of the firm under alternative assumptions about competitive conditions.

Rosse and Panzar (1977) applied Shephard's lemma to a firm's profit maximizing first-order conditions to show that the sum of the elasticities of reduced form revenue function with respect to input prices is a measure of competitive conditions. They assume that the analyst has a sample of long-run equilibrium observations on firm revenue and input price vectors. The approach is to measure the effect of factor prices on observed equilibrium values of total revenue (R'). If R^* is observed revenue and w_i, $i = 1,2,.....n$ is the price of the i-th input, tben the test quantity of H (the Rosse-Panzar H statistic) is

$$H = \sum_{i=1}^{n} \frac{\partial R^*}{\partial w_i} \frac{w_i}{R^*} \qquad (1)$$

In Rosse and Panzar (1977) and Panzar and Rosse (1987), there are four propositions:

I) Under monopoly equilibrium, the sum of the factor price elasticities of a monopolist's reduced form revenue equation must be non-positive.

2) Under monopolistic (Chamberlinian) equilibrium, the sum of the elasticities of firm's reduced form revenues with respect to factor prices is less than or equal to unity.

3) Far firms in long-run competitive equilibrium, the sum of the elasticities of reduced form revenues with respect to factor prices equals unity.

4) For firms in a stable, symmetric, homogenous product, conjectural variation oligopoly equilibrium, the sum of the factor price elasticities of reduced firm output equation is negative.

In order to test monopolistic competition, Panzar and Rosse (1987) follow the Chamberlinian assumption regarding the way in which a firm's revenue function gets repositioned by market forces after an input price change. For example, the entry and exit of an additional product in response to profits and losses will, m the long-run equilibrium, result m the firm's perceived demand curve shifting m or out until zero profits are attained. For derivation of reduced form revenue equation and the proofs of the propositions see Panzar and Rosse (1987).

Shaffer (1982) was the first study to estimate the reduced form revenue equation as a test of market power in banking. Shaffer uses the Rosse-Panzar *H – statistic*, defined as the sum of the elasticity of total revenue of firm with respect to the firm's input prices [eq. (1)], to assesses quantitatively the competitive nature of the banking industry.

In short, the Rosse-Panzar test relies on the fact that an individual hank prices differently in response to changes in its costs, in a way that depends on whether the bank enjoys some monopoly power or instead is operating in a competitive market. Various possible pricing strategies have definable implications for changes in bank's gross revenue (Shaffer, 1994).

If a bank has monopoly power and sets prices to maximize profits, it chooses prices such that its gross revenue responds in the opposite direction from a change in unit costs. If a market is perfectly competitive. the industry's gross revenue could rise or fall, depending upon demand factors, but bank entry and exit would eventually force each surviving bank's revenue to change in the same direction as its unit costs. If revenue change is in the same direction as unit costs, but not by the same proportion. then we conclude that the market is substantially competitive hut not perfectly so.

OVERVIEW OF RECENT LITERATURE

Few researchers have used techniques developed in the contestable markets literature to analyze competitive conditions in the hanking sector. The studies reviewed in this section use the Rosse-Panzar '*H – statistic*' [Rosse and Panzar (1977) and Panzar and Rosse (1987)] to provide a measure of competitive behavior of different hanking sectors.

Calculation of the H – *statistic* is based on the properties of the reduced form revenue equations at the firm level. Thus. H is defined as the sum of the factor price elasticities of a firm's reduced form revenue equation. The data on the revenues and factor prices are the key variables to test the performance and competitive behavior of the hanking markets. Table 2 displays various interpretations of the H – *statistic*.

Table 2. Interpreting the Panzar-Rosse's H-statistic
Source: Molyneux et al (1996)

Competitive environment test		Equilibrium test	
$H < 0$	Monopoly or conjectural variations short-run oligopoly	$H < 0$	Disequilibrium
$0 <$ If < 1	Monopolistic competition	$H = 0$	Equilibrium
$H = 1$	Perfect competition, or natural monopoly in a perfectly contestable market, or sale maximizing firm subject to a breakeven constraint		

A negative value of H indicates that the structure of market is a monopoly, a perfectly colluding oligopoly, or a conjectural variations short-run oligopoly. If H is negative. an increase in factor prices increases marginal costs and reduces equilibrium output. Because a profit-maximizing monopoly never pushes its sales into the range where the demand curve is inelastic, an increase in factor prices leads to reduction in total firm revenue. If H is equal to one, the structure of the market is perfectly competitive. Therefore. an increase in factor prices increases both marginal costs and average costs without changing the equilibrium output level of an average firm in the sector.

The first application of the Panzar and Rosse (1987) methodology to the banking industry is a series of cross-sectional studies by Shaffer (1982) who examines the competitive conditions for a sample of unit banks in New York. Shaffer (1982) estimates the reduced form revenue function of a bank. For the competitive environment test. the dependent variable is defined by total interest revenue. and it is function of factor prices such as the prices of labor, capital, and funds. and some control variables affecting long-run equilibrium of bank revenues. For the equilibrium test, the dependent variable is defined as the return on assets (ROA) and retum on equity (ROE). Shaffer estimates values of H ranging around for 0.32 to 0.36 for the competitive environment test and –0.30 and –0.59 for cquilibrium test and concludes that

hanks in his sample behave neither as monopolists nor as perfectly competitive firms in the long-run equilibrium.

Nathan and Neave (1989) also use the Rosse-Panzar methodology to study data for Canadian financial firms such as commercial banks, trust companies, and mortgage companies over the years 1982 to 1984. They use a similar approach as in Shaffer (1982). Their results for commercial hanks indicate that the 1982 value of H = 1.058 does not differ significantly from unity, hut the values of H = 0.68 and $H = 0.729$ for the years 1983 and 1984, on the other hand, are significantly different from both zero and unity. Therefore, they reject both the monopoly hypothesis and (except in 1982) the hypothesis of perfect competition. They conclude that banking revenues behaves as if they were earned under the monopolistic competition. Nathan and Neave's regression results for mortgage and trust companies yield similar results to those of the commercial hanks.

Molyneux et al. (1994) use the same methodology to assess competitive conditions in major European Community (EC) banking markets between 1986 and 1989. Their results indicate that banks in Germany. the United Kingdom France. and Spain eamed revenues as if monopolistic competition existed in the period. In Italy, on the other hand, hanks earned revenues as if monopoly or conjectural variations short-run oligopoly conditions existed.

Molyneux et al. (1996) use Rosse-Panzar methodology to test for evidence of contestability in the Japanese banking markets. Their estimation is based on a cross-section data sample of 72 Japanese commercial hanks for the years 1986 and 1988. They present results for both the competitive environment and equilibrium test and find that the value of H range between –0.004 and -0.006 for 1986, which are both insignificantly different from zero and unity. Thcrefore, this paper is unable to reject the monopoly or conjectural variations short-run oligopoly hypothesis for Japanese commercial banks. For 1988, however, the H values are 0.245 and 0.423 and they are significantly different from both zero and unity. This rejects both monopoly and perfect competition. Thus, the authors conclude that Japanese banks earned revenues as if under monopolistic competition in 1988. Their empirical findings suggest a change in the market conduct of Japanese commercial hanks between 1986 and 1988

THE ECONOMETRIC SPECIFICATION, DATA, AND EMPIRICAL RESULTS

We employ the Rosse-Panzar (1977) methodology to investigate the competitive conduct of a sample of the Turkish commercial hanks for the years 1983 to 1996. We use a model similar to Shaffer (1992), Nathan and Neave (1989). Molyneux et al. (1994), and Molynuex et al. (1996). The Rosse-Panzar test was applied cross sectionally on the data for Turkish commercial hanks over the years between 1983 and 1996. The revenue equation is specified as follows:
For the competitive environment test,

$$\ln TR = \alpha + \beta_1 \ln(PL) + \beta_2 \ln(PF) + \beta_3 \ln(PK) + \delta_1 \ln(AST) + \delta_2 \ln(DEP) + \delta_3 \ln(BR) + \delta_4 \ln(LO) + \delta_5 \ln(CAP) + u \quad (2)$$

Where:
In = Natural logarithm
TR = Total revenue (interest income and other income)
PL = Unit price of labor calculated by dividing personnel expenses by the total numbers of employees
PF = Unit price of funds obtained by dividing total interest expenses by total interest bearing liabilities
PK = Unit price of capital calculated by dividing capital equipment and occupancy expenses including depreciation, amortization. and rental expenses by total fixed assets
AST = Total bank assets
DEP = Total market deposits
RR = Number of branches/total branches in the system
LO = Total loans/total assets
CAP = Total risk capital/total assets
u, v = Error terms

The first three independent variables, PL, PF, and PK, are input prices and the key variables of the model. The other control variables are included in the regression to account for size and risk characteristics of banks in the sample that could affect the hank's long-run equilibrium revenues. Total assets (AST) are included in the regression to control for possible economies or diseconomies of scale given the wide range of asset size in the sample. The asset size of banks in our sample varies from 8 million to 16 billion U.S. dollars. The relative number of branches (RR) operated by each bank in the industry is included as another proxy for bank size. Total market deposit (DEP) is entered as an independent variable to control aggregate

local demand for banking services. As in the other models [except for Nathan and Neave (1989)], the dependent variable, total revenue (TR), is not risk-adjusted. The degree of risk taking by banks also may affect the revenue. But risk-taking behavior is a difficult attribute to measure. There is no single best measure and all indicators of risk-taking behavior are subject to data availability. Therefore, to account for firm-specific risk, we include two firm-specific risk variables loan to assets ratio (LO) and risk capital to assets ratio (CAP), as in Molynuex et al. (1994) in our regression.

To test whether observations are in the long-run equilibrium, Shaffer (1982) related the return on asset (ROA) to input prices. The model assumes that all observations are in long-run equilibrium. In equilibrium, the rate of return should not be statistically correlated with input prices (Molyneux et al., 1994 and Nathan and Neave, 1989). If the market, on the other hand, is in disequilibrium, an increase in factor prices would be reflected in a temporary decrease in the rate of return, and vice versa. Thus, a value of $H < 0$ is taken to mean a state of disequilibrium, whereas $H = 0$ indicate that the system is in equilibrium. We use the following equation to examine whether observations are indeed in the long-run equilibrium. For the equilibrium test,

$$\begin{aligned} \ln ROA = {} & \alpha + \beta_1 \ln(PL) + \beta_2 \ln(PF) + \beta_3 \ln(PK) \\ & + \delta_1 \ln(AST) + \delta_2 \ln(DEP) + \delta_3 \ln(BR) \\ & + \delta_4 \ln(LO) + \delta_5 \ln(CAP) + v \end{aligned} \quad (3)$$

Under these specifications, $H - statistic$ is $H = \beta_1 + \beta_2 + \beta_3$, i.e., the sum of the factor price elasticities.

Data

The data for this study were obtained from the annual balance sheets and income statement reports from commercial banks operating in the Turkish banking industry over the years 1983 to 1996. Those reports were obtained from the Turkish Bankers Association. The model is estimated for a cross-sectional data set.

Empirical Results

Since the assumption of homoscedastic residual variance is often violated in the cross-sectional data, we test whether the errors are homoscedastic in our model. To investigate this, we used the Lagrange Multiplier (LM) test. The null hypothesis of homoscedastic errors is rejected for the years 1989, 1992, 1994, 1995, and 1996. Therefore, we used the White (1980) estimator for the variance matrix to correct the standard errors. The results of the estimations are presented in Tables 3-6. As seen in Table 3 and 4, the $\bar{R}^2$'s take very high values, which is a sign of better fit.

Table 3. Parameter Estimates and Test Statistics for the Rosse-Panzar Test of Competition Between1988-1992

The Competitive Environment Test Dependent variable: lnTR		1983	1988	1989	1990	1991
α	Constant	-2.657** (-2.623)	7.275* (3.229)	1.452 (1.537)	1.884** (2.062)	1.183*** (1.760)
β_1	lnPL	-0.096 (-0.689)	0.230 (1.121)	0.149 (1.498)	0.090 (0.933)	0.003 (0.040)
β_2	lnPF	-0.090 (-1.485)	0.330** (2.326)	0.505* (5.782)	0.523* (6.160)	0.586* (8.855)
β_3	lnPK	-0.102*** (-1.707)	0.041 (0.811)	-0.007 (-0.197)	0.042 (1.173)	0.052*** (1.674)
δ_1	lnAST	0.726* (7.365)	0.530* (3.935)	0.818* (14.583)	0.793* (11.241)	0.845* (14.186)
δ_2	lnDEP	0.289** (2.586)	0.063 (0.605)	0.039 (0.975)	0.026 (0.697)	0.026 (0.682)
δ_3	lnBR	-0.151** (-2.314)	0.300* (3.565)	0.109** (2.249)	0.48** (2.672)	0.081** (2.047)
δ_4	lnLO	0.229*** (1.909)	0.139 (1.085)	-0.098 (-0.820)	-0.126 (-1.157)	-0.048 (-0.904)
δ_5	lnCAP	-0.046 (-1.107)	-0.124*** (-1.753)	0.025 (0.731)	0.026 (0.809)	0.031 (0.883)
$\overline{R}^2$		0.98	0.95	0.99	0.99	0.99

*, **, *** denote significance level at 1%, 5%, and 10% respectively.
All tests are two-tailed test.
T-statistics are in the parentheses
PL = Price of labor
P F = Price of funds
PK = Price of capital
AST = Total assets
DEP = *Total* deposits
BR = Relative branches
LO = Total loans/total assets ratio
CAP = Capital/total assets ratio

Table 4. Parameter Estimates and Test Statistics for the Rosse-Panzar Test of Competition Between 1993-1996

The Competitive Environment Test Dependent variable: lnTR		1992	1993	1994	1995	1996
α	Constant	2.255* (3.651)	1.829* (3.072)	0.206 (0.303)	-0.090 (-0.152)	1.810* (3.876)
β_1	lnPL	0.183* (3.102)	0.232** (2.484)	0.201** (2.183)	0.054 (0.798)	0.239* (3.636)
β_2	lnPF	0.373* (14.985)	0.511* (9.168)	0.467* (9.326)	0.383* (9.959)	0.401* (8.193)
β_3	lnPK	0.074** (2.167)	0.081** (2.545)	0.024 (0.810)	0.024 (0.735)	0.063* (2.743)
δ_1	lnAST	0.739* (15.446)	0.853* (14.685)	1.111* (10.044)	1.302* (7.045)	0.941* (6.692)
δ_2	lnDEP	0.057*** (1.936)	0.034 (1.109)	-0.159 (-1.481)	-0.331*** (-1.882)	-0.097 (-0.663)
δ_3	lnBR	0.177* (4.614)	0.119* (2.701)	0.045 (0.996)	0.064** (2.036)	0.158* (4.462)
δ_4	lnLO	-0.130*** (-1.956)	-0.075 (-1.491)	-0.153* (-3.031)	-0.202** (-2.081)	-0.005 (-0.082)
δ_5	lnCAP	0.002 (0.006)	0.101*** (1.859)	0.031 (0.600)	0.098 (1.461)	-0.004 (-0.112)
$\overline{R}^2$		0.99	0.98	0.99	0.99	0.99

*, **, *** denote significance level at 1%, 5%, and 10% respectively.
T-statistics are in the parentheses

The sign on the coefficients f a the key variables, price of labor (PL), price of funds (PF), and price of capital (PK), are almost always positive and statistically significant for all years except for 1983.

In the case of other control variables, *the* signs on asset size (AST) and relative branches (BR) coefficients are positive and statistically significant f a all years, indicating that size-induced differences between banks may lead *to* higher total revenue. Therefore, the regressions indicate that total assets and relative branches appear to capture *size* effect in *the* model. The sign of the coefficient for the total deposits (DEP) is positive for some years and negative for others, but it is statistically insignificant m most cases. *The* lam to asset ratio is negatively related to revenue, implying that banks with a higher proportion of loans in their portfolios are likely to have lower revenue than similar banks with smaller ratios. These results indicate that lending is a risky business. The capital to asset ratio is, on the other hand, positively related m revenue, *implying* that banks with a higher ratio of risk capital are likely to have higher revenue. Table 5 and *6* present the regression results for the long-run equilibrium condition.

Table 5. Parameter Estimates and Test Statistics for the Rosse-Panzar Test of Long-Run Equilibrium Between 1988-1992

The Equilibrium Test Dependent variable: lnROA		1983	1988	1989	1990	1991
α	Constant	-1.277 (-0.749)	1.870 (0.993)	2.182 (1.572)	2.227 (1.191)	5.970* (4.864)
β_1	lnPL	0.086 (0.368)	0.062 (0.356)	0.139 (1.056)	-0.013 (-0.068)	0.453* (2.735)
β_2	lnPF	-0.074 (-0.722)	-0.127 (-1.057)	0.285*** (1.689)	0.004 (0.020)	-0.353* (-2.919)
β_3	lnPK	0.011 (0.111)	-0.059 (-1.391)	-0.056 (-0.900)	0.039 (0.527)	0.052 (0.916)
δ_1	lnAST	0.207 (1.248)	-0.141 (-1.234)	-0.164 (-1.487)	-0.099 (-0.692)	-0.508* (-4.670)
δ_2	lnDEP	-0.180 (-0.954)	-0.016 (-0.185)	-0.089 (-1.010)	-0.221* (-2.855)	-0.005 (-0.078)
δ_3	lnBR	0.048 (0.434)	0.137*** (1.922)	0.194* (2.488)	0.300** (2.649)	0.471* (6.501)
δ_4	lnLO	-0.124 (-0.614)	0.107 (0.986)	0.040 (0.208)	0.056 (0.253)	-0.011 (-0.108)
δ_5	lnCAP	0.528* (7.605)	0.506* (8.377)	0.355* (3.079)	0.307* (4.614)	0.462* (7.138)
$\overline{R}^2$		0.80	0.73	0.51	0.64	0.75

*, **, ***denote significancelevel at 1%, 5%, and 10% respectively. T-statistics are in the parentheses

Table 6. Parameter Estimates and Test Statistics for the Rosse-Panzar Test of Long-Run Equilibrium Between 1993-1996

The Equilibrium Test Dependent variable: lnROA		1992	1993	1994	1995	1996
α	Constant	3.115** (2.467)	1.139*** (1.953)	-0.534 (-0.352)	-0.024 (-0.023)	0.207 (0.224)
β_1	lnPL	0.242** (2.524)	0.087 (0.949)	-0.014 (-0.098)	-0.096 (-0.758)	0.003 (0.041)
β_2	lnPF	-0.023 (-0.419)	0.025 (0.464)	0.059 (0.996)	0.042 (0.557)	-0.014 (-0.163)
β_3	lnPK	-0.025 (-0.564)	-0.059*** (-1.906)	-0.124* (-2.933)	-0.125* (-4.079)	-0.112* (-2.341)
δ_1	lnAST	-0.299** (-2.038)	-0.025 (-0.432)	0.111 (0.817)	0.662* (3.577)	0.214 (1.116)
δ_2	lnDEP	0.003 (0.086)	-0.076** (-2.515)	-0.118 (-0.854)	-0.809* (-4.458)	-0.359*** (-1.750)
δ_3	lnBR	0.234* (3.241)	0.139* (3.234)	0.042 (0.458)	0.113** (2.062)	0.069 (0.961)
δ_4	lnLO	0.050 (0.480)	-0.037 (-0.759)	-0.179*** (-1.877)	-0.169*** (-1.775)	0.061 (0.658)
δ_5	lnCAP	0.496* (2.976)	0.715* (13.466)	0.707* (8.523)	0.371* (3.993)	0.376' (3.617)
$\overline{R}^2$		0.73	0.61	0.70	0.64	0.60

*, **, *** denote significance level at 1%, 5%. and 10% respectively.

The calculated H – *statistics* for competitive environment test and the long-run equilibrium test, which use the return on assets (ROA) as the dependent variable, are presented in Table 7 for each year in the sample period. The estimated values of H for the long-run equilibrium test are not statistically different from zero. Thus, the long-run equilibrium condition appears to be established in each of the ten years and therefore, the H – *statistics can* be meaningfully interpreted.

Table 7. Competitive Position and Equilibrium Tests for the Turkish Commercial Banks Between 1983-1996

	Competitive Environment Test	Equilibrium Test
1983	H = -0.288 F1 = 3.67* F2 = 22.19*	H = 0.023 F1 = 0.4E-3
1988	H = 0.602 F1 = 5.64* F2 = 6.57*	H = -0.125 F1 = 0.33
1989	H = 0.647 F1 = 27.32* F2 = 8.20*	H = 0.368 F1 = 2.2
1990	H = 0.663 F1 = 26.60* F2 = 6.79*	H = 0.030 F1 = 0.01
1991	H =0.642 F1 = 23.22* F2 = 8.8*	H = 0.153 F1 = 0.48
1992	H = 0.631 F1 = 52.02* F2 = 16.46*	H = 0.193 F1 = 1.16
1993	H = 0.825 F1 = 55.95* F2 = 3.68*	H = 0.055 F1 = 0.23
1994	H = 0.693 F1 = 28.10* F2 = 5.55*	H = -0.078 F1 = 0.15
1995	H = 0.462 F1 = 42.52* F2 = 57.00*	H = -0.179 F1 = 1.2
1996	H = 0.703 F1 = 67.15* F2 = 12.11*	H = -0.122 F1 = 0.76

H = the sum of elasticities of reduced form revenue function with respect to input prices, ($H = \beta_1 + \beta_2 + \beta_3$).
F1 = F-statistic for testing the hypothesis H = 0.
F2 = F-statistic for testing the hypothesis H = 1.
* denotes significance level at 5%.

As shown in Table 7, for 1983, the H value of -0.288, which is statistically different from both zero and unity at five-percent level. Thus, we are unable to reject the monopoly or conjectural variations short-run oliiiy hypotheses for the Turkish commercial banks. For the period between 1988 and 1996, on the other hand, the estimated values of the H – *statistics* for the competitive environment test are positive and are statistically different from both zero and unity at least at the five-percent levels. This result rejects the monopoly hypothesis ($H = 1$) and perfect competition hypothesis ($H = 0$). Turkish commercial banking revenues behave as if they were earned under the monopolistic competition for dl years between 1988 and 1996. This result is consistent with the contestable market theory. Finally, the data indicate that there were changes in the competitive conditions between early 1980s and late 1980s and the first half of 1990s.

One could argue that the Turkish commercial banks could exercise market power because of high

concentration impairing competitiveness in the banking market. The empirical findings of this paper indicate that even though Turkish banking system is dominated by large state-owned and private banks, revenues were eamed as if the industry was monopolistically competitive between 1988 and 1996. Therefore, the empirical results are consistent with the theory of contestability that market structure is determined by industry characteristics. The financial liberalization program in early 1980s could he an explanation for the change in the market conduct. Opening the banking markets for new entrants. particularly foreign banks, were the most important element of the competition. Since 1980, the number of foreign banks operating in Turkey has increased from 4 to 20. Total numbers of banks. on the other hand, has increased from 43 to 69. From our empirical findings one can conclude that this numerical increase in the market has changed the market conduct.

Finally, the empirical results of this paper support recent research by Nathan and Neave (1989), Molyneux et al. (1994), and Molyneux et al. (1996) that a high degree of competition is possible even in structurally concentrated banking markets.

CONCLUSIONS

This paper investigates empirically the competitive conditions of the Turkish banking sector for the years 1983 to 1996 by applying a new method previously applied to the U.S. and Canadian banking industries. The Rosse and Panzar test has been performed to test the contestability of the banking. The empirical findings of our study suggest that the banking market in Turkey was neither monopolistic nor perfectly competitive between 1988 and 1996. Therefore, banking revenues behave as if they were earned under the monopolistic competition. Our results also indicate that the commercial banking in 1983 earned revenues under the monopoly or conjectural variations short-run oligopoly. Thus, the market conduct of Turkish commercial banks between 1983 and 1988-1996 changed. Because of deregulation, the most restrictions on market entry, interest rates. and exchange rates were eliminated in the early 1980s. Today. there are only a few restrictions on market entry. leaving relatively free access for entry by new hanks. particularly foreign banks. Empirical estimation confirms the effects of recent policy changes. Thus. by looking at concentration ratios. one cannot reach a conclusion about market conduct.

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